

DRUG & ALCOHOL FINDINGS *Research analysis*

This entry is our analysis of a study considered particularly relevant to improving outcomes from drug or alcohol interventions in the UK. The original study was not published by Findings; click [Title](#) to order a copy. Free reprints may be available from the authors – click [prepared e-mail](#). [Links](#) to other documents. [Hover over](#) for notes. [Click to](#) highlight passage referred to. [Unfold extra text](#) . The Summary conveys the findings and views expressed in the study. Below is a commentary from Drug and Alcohol Findings.

Send email for updates

[SEND](#) [About updates](#)

▶ [Title and link for copying](#) ▶ [Comment/query to editor](#) ▶ [Tweet](#)

▶ **Opioid overdose rates and implementation of overdose education and nasal naloxone distribution in Massachusetts: interrupted time series analysis.**

Walley A.Y., Xuan Z., Hackman H.H. et al.
British Medical Journal: 2013, 346(f174).

Unable to obtain a copy by clicking title? Try asking the author for a reprint by adapting this [prepared e-mail](#) or by writing to Dr Walley at awalley@bu.edu.

This real-world implementation of overdose education and nasal naloxone distribution in Massachusetts illustrates the life-saving potential of these programmes.

SUMMARY Drug overdose is a major cause of death in Canada, Europe, Asia and the United States (US). This paper reports on the findings of an observational study set in the US state of Massachusetts where, over the past decade, annual rates of deaths related to **opioid** overdoses alone have exceeded those of motor vehicle deaths. The authors evaluate whether overdose education and the distribution of nasal **naloxone** proved to be an effective way of reducing the risks of opioid overdose.

Overdose education and **naloxone** distribution programmes aim to equip people who are at risk of **opioid** overdose as well as potential bystanders (eg, other **opioid** users, family and friends, and social service staff) with training in “how to prevent, recognise, and respond to an overdose by engaging emergency medical services, providing rescue breathing, and delivering **naloxone**”, a drug which can reverse the effects of an **opioid** overdose. From 1996–2010 over 50,000 people in the US were trained through overdose education and **naloxone** distribution programmes, resulting in over 10,000 overdose rescues.

In Massachusetts these programmes (supported by the Department of Public Health) have been rolled-out since 2006. As no studies of overdose education and **naloxone** distribution have been completed in a controlled research setting, the authors of this study felt that the implementation of the programmes in Massachusetts created an opportunity to examine their impact in real-life settings. The programmes in question were offered at a range of sites including syringe access programmes, HIV education drop-in centres, addiction treatment programmes, emergency and primary healthcare settings, and community meetings, such as support groups for members of **opioid** users’ families. The training lasted 10–60 minutes, and was tailored to the existing knowledge of the participant but typically included: information about the risks of using multiple substances; building awareness that a person’s tolerance for a substance will decrease after abstinence; the risks of using substances alone; recognising overdose by assessing for unresponsiveness and slower breathing; and what to do in the event of witnessing an overdose (the recommendation being to provide rescue breathing, administer nasal **naloxone**, and to stay with the person until medical help arrives or the person recovers). The sessions concluded with participants demonstrating that they could administer **naloxone** using the device provided.

Massachusetts consists of 351 geographically distinct communities (cities and towns). A total of 19 communities were included in this study – each considered to bear a high burden of **opioid** overdose, having at least five fatal overdoses every year between 2004 and 2006. Altogether these communities made up about 30% of the state population and contributed almost half of Massachusetts’ fatal **opioid** overdoses and emergency care (visits to emergency departments and hospital admissions) for non-fatal **opioid** overdoses.

The researchers examined rates of **opioid** overdose-related deaths and emergency care year-by-year from 2002–2009, and compared communities with different levels of implementation of the programme: no implementation, low implementation, and high implementation. They categorised low and high implementation in two different ways. Firstly, by taking the enrolment rates of all communities, and classifying communities with low implementation as those falling below the middle number of enrolment, and those with high implementation as those with greater than the middle number of enrolment. Secondly, by classifying communities with low implementation as those with 1–100 people enrolled per 100,000 population, and communities with high implementation as those with more than 100 people enrolled per 100,000 population.

Data for the study came from the Massachusetts Department of Public Health (which records fatal opioid-related drug poisonings), the Massachusetts Division of Health Care Finance and Policy (which records opioid-related drug poisonings on their inpatient hospital and outpatient emergency department discharge database), and questionnaires completed by people participating in the programmes. Questionnaires were completed during enrolment, gathering information about the zip code (US equivalent of postcode) of residence, drug use history, and overdose history. When a participant requested an additional naloxone kit another questionnaire was completed, which asked about the zip code of the place the overdose occurred, relationship to the person who overdosed, setting (public or private), number of naloxone doses used, whether naloxone was successful, emergency service involvement, whether they used rescue breathing, and whether they stayed with the person who overdosed. Needing another kit was presumed to mean previous kits had been used to prevent an overdose, which was defined as an episode when an individual was unresponsive and had signs of respiratory depression after using substances. Self-administered naloxone was not counted as a rescue.

Key points
 From summary and commentary

The focus of this study is the impact of overdose education and nasal **naloxone** distribution in the US state of Massachusetts.

Researchers observed that death rates from **opioid** overdose were significantly reduced in communities where the programmes were implemented.

This illustrates the promise of overdose education and **naloxone** distribution as a public health intervention to address the epidemic of fatal **opioid** overdose.

signs of respiratory depression after using substances. Self-administered naloxone was not counted as a rescue attempt because a person able to self-administer would not have been considered unresponsive. Naloxone was defined as successfully administered if the person's unresponsiveness and respiratory depression improved.

Main findings

In total, 2912 people participated in the training, and 327 rescue attempts were made by 212 individuals. Most rescue attempts occurred in private settings, and the rescuer and the person who overdosed were usually friends. Naloxone was successful in 98% of the rescue attempts. In the three rescue attempts where naloxone was not successful, the people who overdosed received care from the emergency services and survived. The experience of witnessing an overdose was common both among people who at enrolment used opioids and those who did not. Those who reported using opioids commonly had a personal history of overdose and reported detoxification treatment and incarceration in the past year.

When categorised by numbers enrolled per 100,000 of the population, communities with high and low rates of implementation had significantly reduced incidence rates of deaths related to opioid overdose (0.54 and 0.73 respectively), compared with communities with no implementation. Furthermore, the higher the rate of implementation over time in communities, the greater the reduction in death rates. This pattern was not found when communities were divided into high and low rates of implementation either side of the middle figure of enrolment. There was also no statistically significant difference in rates of emergency care across communities with high, low or no implementation.

The authors' conclusions

This study observed the implementation of overdose education and nasal naloxone distribution programmes in real-life settings. Between 2006 and 2009, thousands of people were trained, resulting in hundreds of reported rescue attempts in Massachusetts.

Death rates from opioid overdose were significantly reduced in communities where the programmes were implemented. Looking closer at the results, it also appeared that the programmes had a 'dose-response' effect – the higher the rate of implementation over time, the greater the reduction in death rates. This positive impact was not reflected in rates of emergency care. By preventing overdoses, naloxone programmes might have been expected to reduce visits to emergency departments and hospital admissions for the treatment of opioid poisoning, but they might also increase visits by encouraging bystanders to engage with emergency services – an explicit part of the programmes' curriculum. The researchers suggested that "this balance of reducing and increasing the use of the emergency medical system may be why no association was found for acute care utilization" (emergency care).

Using an observational approach, this study cannot prove definitively that overdose education and nasal naloxone distribution programmes caused a reduction in opioid related overdose death rates. But overall, the findings do indicate that overdose education and naloxone distribution may be an effective public health intervention to address the epidemic of fatal opioid overdose.

FINDINGS COMMENTARY Naloxone is an effective and rapid way of reversing the effects of opioid overdose, and can be administered in a range of ways (via needle straight into the vein, muscle or under the skin, or nasal spray) depending on the setting and skill of the person. Naloxone became the new hope for curbing the numbers of people dying from opioid overdose after in 2005 UK law was amended to permit emergency administration by any member of the public. In May 2013 the naloxone 'kit' Prenoxad was approved in the UK for use in opioid overdose emergencies by non-medical personnel. This approval was seen as an important step to widening availability – meaning that GPs could prescribe kits to suitably trained drug users, friends and families. Scotland lifted these restrictions further, allowing emergency-use naloxone to be provided to services without prescription, enabling drug treatment and homeless hostel staff to have the drug ready for use. National naloxone programmes have been in place in Wales and Scotland since 2011. In the name of localism England has so far not established a centrally driven national programme. Towards the end of 2014, the relative inaction in England and the recent increase in deaths there prompted the formation of the Naloxone Action Group "to push the agenda".

Experts convened by the World Health Organization have judged the "risk-benefit profile to be strongly in favour of naloxone distribution, due to its clear potential for saving lives and apparent low risk of significant adverse effects", and strongly recommend naloxone provision and associated training for people likely to witness an opioid overdose. However, broader measures to prevent opioid overdose, described by both the World Health Organization and Public Health England, should include: monitoring opioid prescribing practices; cutting down on inappropriate opioid prescribing and over-the-counter sales; and increasing the rate of treatment of opioid dependence, including for those dependent on prescription opioids.

The study reported here observed the impact of overdose education and the distribution of naloxone in the US state of Massachusetts. The findings indicate the life-saving potential of equipping opioid users with the knowledge to prevent and detect overdose, and in the event of witnessing an overdose, the equipment to respond with treatment. In the absence of randomised control trials, this large scale real-world evaluation is an important addition to the field, considering the distribution of the lesser studied nasal form of naloxone.

The education and distribution programmes were rolled-out at a variety of sites in the community, but sites which, it could be argued, were most likely to be accessed by people already perceived in society to be 'problem' opioid users (and the people close to them) – for example, those using illicit opioids, those known to treatment services, or those who have already experienced an overdose. This leaves a gap in knowledge about the impact of overdose education and naloxone distribution programmes on other sorts of participants. Furthermore, the paper does not go into detail about the preventative aspect of the training, but it did not appear to include awareness of the risks of overdose to people known to opioid users, for example, the risks of accidental ingestion by children.

This large scale real-world evaluation indicates the life-saving potential of overdose education and nasal naloxone

The essence of overdose education and naloxone distribution is harm reduction, and many of the criticisms of such programmes echo broader concerns about harm reduction – namely that they will encourage increased drug use, and enable drug users to bypass contact with professionals who may be able to encourage behavioural change/promote abstinence – albeit concerns not bolstered by evidence. One of the drawbacks of naloxone, from the perspective of some treatment services (especially those with a recovery orientation), is that catering for the likelihood that their patients will relapse to life-threatening opioid may seem counter-therapeutic. For patients looking forward to a new life where they have escaped drugs and drugtaking circles, learning a lifesaving technique predicated on continued contact with (harmful) injecting drug use (or) could seem discouraging and inappropriate. The complexity of resistance to harm

with (largely) injecting drug use(s) [could seem](#) discouraging and inappropriate. The complexity of resistance to harm reduction practices is illustrated in the latter point – it is not just something which people are ideologically opposed to (as an implicit acceptance of substance use) but something which people feel may actively jeopardise their personal recovery. [Ultimately](#), “providing overdose prevention training and take-home [naloxone](#) [could] empower drug users to protect themselves and those around them” and “working to prevent overdose deaths rather than focusing exclusively on stopping drug use may enable opiate users to live long enough to have the opportunity to pursue effective treatment when they are ready”.

The many factors contributing to overdoses, and possible strategies for preventing them are explored in this Effectiveness Bank [hot topic](#), and more thoroughly so in this two-part Effectiveness Bank [series](#).

Thanks for their comments on this entry in draft to research author Dr. Walley of the Boston University School of Medicine. Commentators bear no responsibility for the text including the interpretations and any remaining errors.

Last revised 30 August 2016. First uploaded 18 August 2016

- ▶ [Comment/query to editor](#)
- ▶ [Give us your feedback on the site \(two-minute survey\)](#)
- ▶ [Open Effectiveness Bank home page](#)
- ▶ [Add your name to the mailing list](#) to be alerted to new studies and other site updates

Top 10 most closely related documents on this site. For more try a [subject](#) or [free text](#) search

STUDY 2016 [Effectiveness of Scotland’s National Naloxone Programme for reducing opioid-related deaths: a before \(2006–10\) versus after \(2011–13\) comparison](#)

HOT TOPIC 2015 [Overdose prevention](#)

REVIEW 2016 [Preventing opioid overdose deaths with take-home naloxone](#)

DOCUMENT 2014 [Community management of opioid overdose](#)

DOCUMENT 2014 [Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations](#)

STUDY 2012 [The impact of take-home naloxone distribution and training on opiate overdose knowledge and response: an evaluation of the THN Project in Wales](#)

REVIEW 2014 [A review of buprenorphine diversion and misuse: the current evidence base and experiences from around the world](#)

STUDY 2011 [The NTA overdose and naloxone training programme for families and carers](#)

REVIEW 2012 [Consideration of naloxone](#)

STUDY 2015 [Risk of mortality on and off methadone substitution treatment in primary care: a national cohort study](#)